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Archaeozoological evidence for the former presence of spotted-necked otter (*Lutra maculicollis*) in Egypt

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Abstract. A description is given of the skeletal remains of otter discovered at the Late Palaeolithic fishing sites Makhadma 2 and 4. This is the second archaeozoological find of otter in Egypt and the first one that allows an identification at species level. The possible reasons for the rarity of otter remains in sites along the Egyptian Nile are discussed as well as the possible causes for the present-day local extinction of the species. The consequences of these bone finds for the interpretation of animal depictions and statuettes in ancient Egyptian art are briefly mentioned.

Key words. Otter, Egypt, extinction, archaeozoology.

Introduction

Otters are presently absent from Egypt (Osborn & Helmy 1980), but it is believed on the basis of iconographic data and historical accounts that they occurred here in the past (Wreszinski 1927; Keimer 1942; Brunner-Traut 1968). The few artistic representations, dating to the Pharaonic and Ptolemaic periods, and sight records mentioned by Herodotus and 17th century travellers were reviewed by Houlihan (1996), who concluded that otters must never have occurred in the Egyptian Nile. He believes that the depictions, statuettes and sight records rather represent the Egyptian mongoose (*Herpestes ichneumon*), a species that can be mistaken for otter since it frequently ventures into the water and can also consume fish. As an additional argument, Houlihan (1996) pretends that, in contrast to mongoose, no otter remains have ever been found in archaeological excavations, thereby overlooking the find of *Lutra* sp. reported from Catfish Cave (Reed 1966). The latter find dates to the Late Palaeolithic and is situated in Egyptian Nubia. The remains described in the present paper are from Late Palaeolithic Makhadma, in Middle Egypt (Fig. 1).

Two otter species occur in northern Africa today and it remains to be verified which species is represented at the Makhadma sites. Common otter (*Lutra lutra*) presently inhabits parts of the Maghreb and is known from the Near East (Harris 1968; Harrison 1968). Harrison (1968) compiled the 19th and 20th century records of common otter from the southern part of that region, indicating that the species lived along the shores of Lake Galilee, Lake Tiberias, Lake Huleh, and the mouth and upper reaches of the Jordan river. The spotted-necked otter (*Lutra maculicollis*) is considered a typical species of the Ethiopian faunal province (Harris 1968; Haltenorth & Diller 1980). Along the Nile, it has been reported south of latitude 13°N in southern Sudan (Harris 1968). On zoogeographical grounds it is difficult to decide on the most likely candidate. On the basis of geographical proximity of the near-eastern populations, Boessneck (1988: 51) concluded that the sixth Dynasty

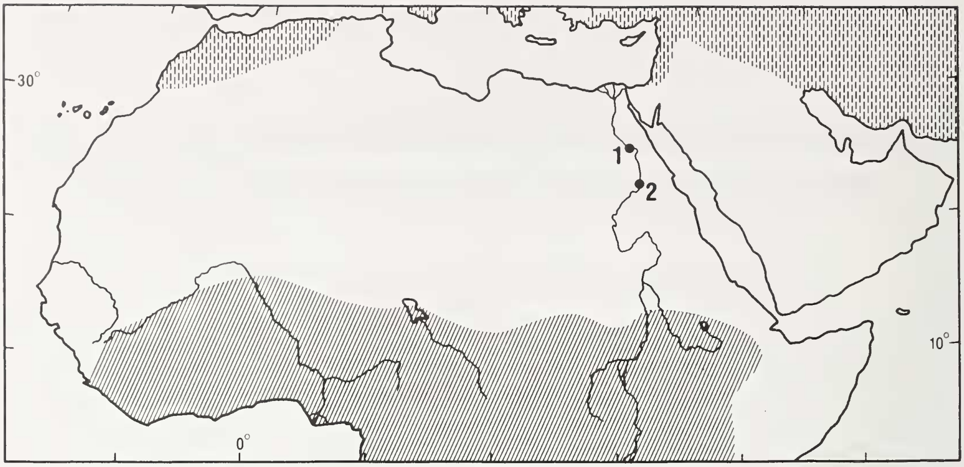

Fig. 1. Map of northern Africa and the Levant showing the modern distribution of common otter (vertical hatching) and spotted-necked otter (oblique hatching). The archaeological sites in Egypt where otters have been found are indicated as follows: 1, Makhadma; 2, Catfish Cave.

representation of otter in the tomb of Mereruka would rather be *Lutra lutra*. However, because of their aquatic habits otters can spread most effectively through waterways, which would make *Lutra maculicollis* a more likely candidate despite the large distance (southern Sudan) at which they occur today.

The Makhadma sites and their fauna

Eight remains of otter were found during the excavation of the Late Palaeolithic sites of Makhadma 4 and Makhadma 2 that were most probably occupied between 12500 and 12150 cal BC (Van Neer et al. 2000). These sites are located near Qena on the eastbank of the Nile, along the edge of the former floodplain (Vermeersch et al. 1989, 2000). They are situated on the lower part of a steep slope, but were on sufficiently high ground to stay out of reach of the annual Nile floods. The archaeological deposits of both sites represent middens rich in animal bone, flint, charcoal fragments and ash. Of the more than 40,000 faunal remains that were analysed, 12,500 were identifiable. The frequencies of the identified taxa indicate that fishing was the major activity on both sites, while hunting, fowling and mollusc collecting were practised only occasionally. Fishing focussed on a few taxa only (mainly *Clarias* catfish and tilapia) and was practised in the floodplain. It appears from their size distribution and from a growth ring analysis of the tilapia otoliths that the fish were mainly captured after the maximum of the floods when the flood waters receded and residual pools started forming. The morphology of the valley bottom and the sites' location close to a wadi mouth resulted in extensive wadable areas and must have facilitated a prolonged exploitation of these fishing grounds. The fact that the inhabitants focussed mainly on aquatic resources is also indicated by the fact that taxa other than fish are also mainly aquatic in habits. The bird remains are mainly from ducks and geese (Anatidae), and coot (*Fulica atra*); among the mammals, otter (*Lutra*) and hippopotamus (*Hippopotamus amphibius*) are represented. Only a few bones of hare (*Lepus capensis*), aurochs (*Bos primigenius*) and hartebeest (*Alcelaphus buselaphus*) occur among the terrestrial mammals and also unidentifiable mammal bone is rare. Repetitive use of the sites is indicated by their stratigraphy. It is clear that the inhabitants were primarily interested in the extensive, seasonal exploitation of the fish fauna in the inundated area. Since this was a predictable food resource, people must have been using the sites for several decennia, possibly centuries. The massive amounts of charcoal and fish bones in the archaeological layers and the presence of postholes indicate that fish curing was practised and that it involved the use of fire. Little archaeological evidence is available for the fishing methods that were used. A few small double points made of bone have been interpreted as fish gorges. Possibly, net fishing was practised if it is accepted that the cobbles found near Makhadma 4 represent net weights.

The otter remains and their identification

The sites of Makhadma 4 and 2 yielded 3 and 5 otter remains, respectively (Table 1). Generally speaking, the mammal material from Makhadma is in a poor state of preservation. It is very brittle and powdery due to heavy weathering. Surface cracking occurred and several bones were partly covered with salt crystals. This explains why only a few measurements could be taken on the otter remains. The measurements indicated are in millimetres and, for the postcranial remains, were taken according to the standards described by A. von den Driesch (1976). For the dental remains, the measurements used are those defined by Pohle (1920) in his revision of the Lutrinae subfamily.

No morphological differences were observed among modern *Lutra lutra* and *Lutra maculicollis* that could help to identify the postcranial bones found at Makhadma.

Table 1: Skeletal elements of otter found at the Makhadma sites.

Makhadma 2:

- axis
- proximal humerus
  - proximal width (Bp) 13.8
- 2 proximal ulnae
- proximal femur
  - proximal width (Bp) 17.5
  - depth of the caput femoris (DC) 8.7

Makhadma 4:

- proximal ulna fragment
- humerus fragment
- left maxilla with P4 and M1 in situ (see text and Figure 2 for definition of measurements)
  - length of the outer side of P4: 10.3
  - length of P4: 8.8
  - width of P4: 8.9
  - length of the talon of M1: 6.1
  - largest diameter of M1: 10.1

One femur and one humerus from Makhadma were sufficiently preserved to take measurements and it was verified if osteometric differences could be found for those elements on modern material (Table 2). The investigated modern specimens are 2 skeletons of *Lutra maculicollis* from Lake Kivu, 6 individuals of *Lutra lutra lutra* captured in Belgium at the end of the 19th and during the first half of the 20th century, and 4 *L. l. seistanica* from the region of the Sea of Galilee. In addition, one individual of *L. l. meridionalis* from Iran was considered. The data from Table 2 show that the long bones of common otter are larger than those of the spotted-necked otter. This is the case both for the specimens from Western Europe and from the Near East. The small dimensions of the Makhadma femur and humerus clearly indicate that they can be attributed to *L. maculicollis*.

Table 2: Measurements of the postcranial bones of the Makhadma otters compared to those of modern *Lutra lutra* and *Lutra maculicollis*. The femur was available from only one *L. maculicollis*.

	Makhadma –	*L. maculicollis* n = 2	*L. l. lutra* n = 6	*L. l. seistaniea* n = 4	*L. l. meridionalis* n = 1
humerus, Bp	13.8	14.0–15.5	18.0–19.1	19.2–21.9	18.1
femur, Bp	17.5	?–18.9	20.0–22.5	22.7–26.1	22.2
femur, DC	8.7	?–9.6	10.9–11.3	11.5–13.4	11.4

For the maxilla fragment a similar identification strategy was followed. Rosevear (1974: 141) summarizes the cranial differences between the subgenera *Lutra* (including *L. lutra*) and *Hydrictis* (including *L. maculicollis*). Besides its less robust build, *L. maculicollis* differs from *L. lutra* by the narrowness of the interorbital region and the complete absence of the postorbital process. These and other features mentioned by Rosevear (1974) cannot be used on the maxilla fragment from Makhadma, leaving only the tooth morphology and dental measurements as possible diagnostic criteria. Pohle (1920: 32) describes odontological differences between the various otter groups and mentions differences for the first upper molar. The parastyle would be more pronounced in the *maculicollis* group than in *lutra* and also the proportions of the talon would be different. These relative, qualitative data appeared, however, not very straightforward and difficult to use on the Makhadma material and it was therefore preferred to rely on dental measurements. The series investigated by Pohle (1920) are mainly from the Zoologisches Museum Berlin and include *Lutra lutra* specimens from the Levant and the Maghreb. The neareastern individuals comprise a specimen from Lake Tiberias and one from a river south of Jaffa. From the Maghreb, 10 specimens were measured that were caught in Morocco, Algeria and Tunesia. Useful dental measurements for *Lutra maculicollis* are also provided by Pohle (1920). They were taken on 13 specimens from southern Africa, western Africa (Cameroon and Liberia), and the interlacustrine zone (specimens designated as *L. maculicollis kivuana*). One specimen of *L. m. nilotica* from Malek, a locality south of Bor on the upper Nile in Sudan, curated at the British Museum, was included as well although not all the dental measurements, taken on the other specimens, are listed.

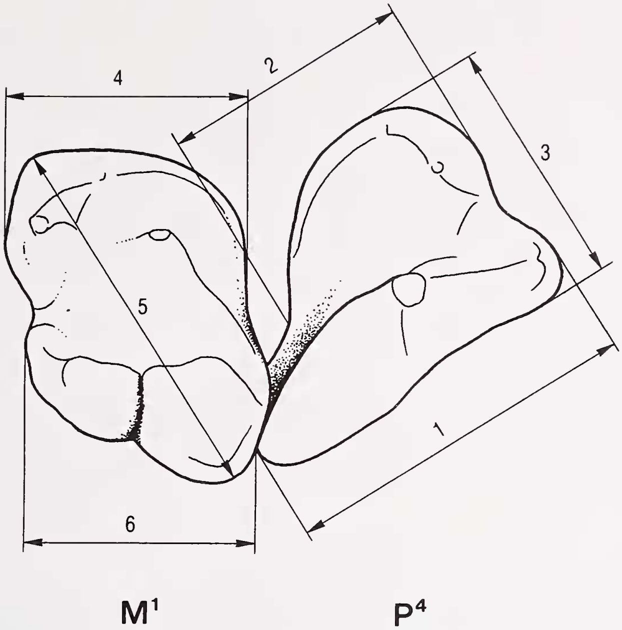

Fig. 2. Measuring distances for the upper P4 and M1 of otter. 1, length of the outer side of the P4; 2, length of the P4; 3, width of the P4; 4, length of the talon of the M1; 5, largest diameter of M1; 6, length of the outer side of the M1.

It was decided to compare the dental measurements of the Makhadma specimens to those compiled by Pohle (1920). No figure of the measuring distances was provided in his publication, but it is believed that the following measurements were taken (Fig. 2):

1. “Außenkante P4” = length of the outer side of the P4, i.e. the mesio-distal distance of the buccal side of the P4
2. “Länge des P4, gemessen vom Vorderrande des Zahnes bis zum Hinterrand des Talons” = length of the P4, i.e. distance from the mesial edge of the tooth to the distal edge of the talon
3. “Breite des P4” = width of the P4, i.e. the largest bucco-lingual distance of the P4
4. “Talonlänge des M1” = length of the talon of the M1, i.e. mesio-distal distance of the talon of the M1
5. “Größte Durchmesser M1” = largest diameter of M1. This measuring distance is a rather confusing one. It is believed that it represents the largest diagonal distance between the mesio-buccal edge and the disto-lingual edge, rather than the bucco-lingual distance of the M1. If the latter measurement was meant, Pohle (*ibid.*) would have used “Breite” (width) instead.
6. “Außenkante M1” = length of the outer side of the M1, i.e. the mesio-distal distance of the buccal side of the M1.

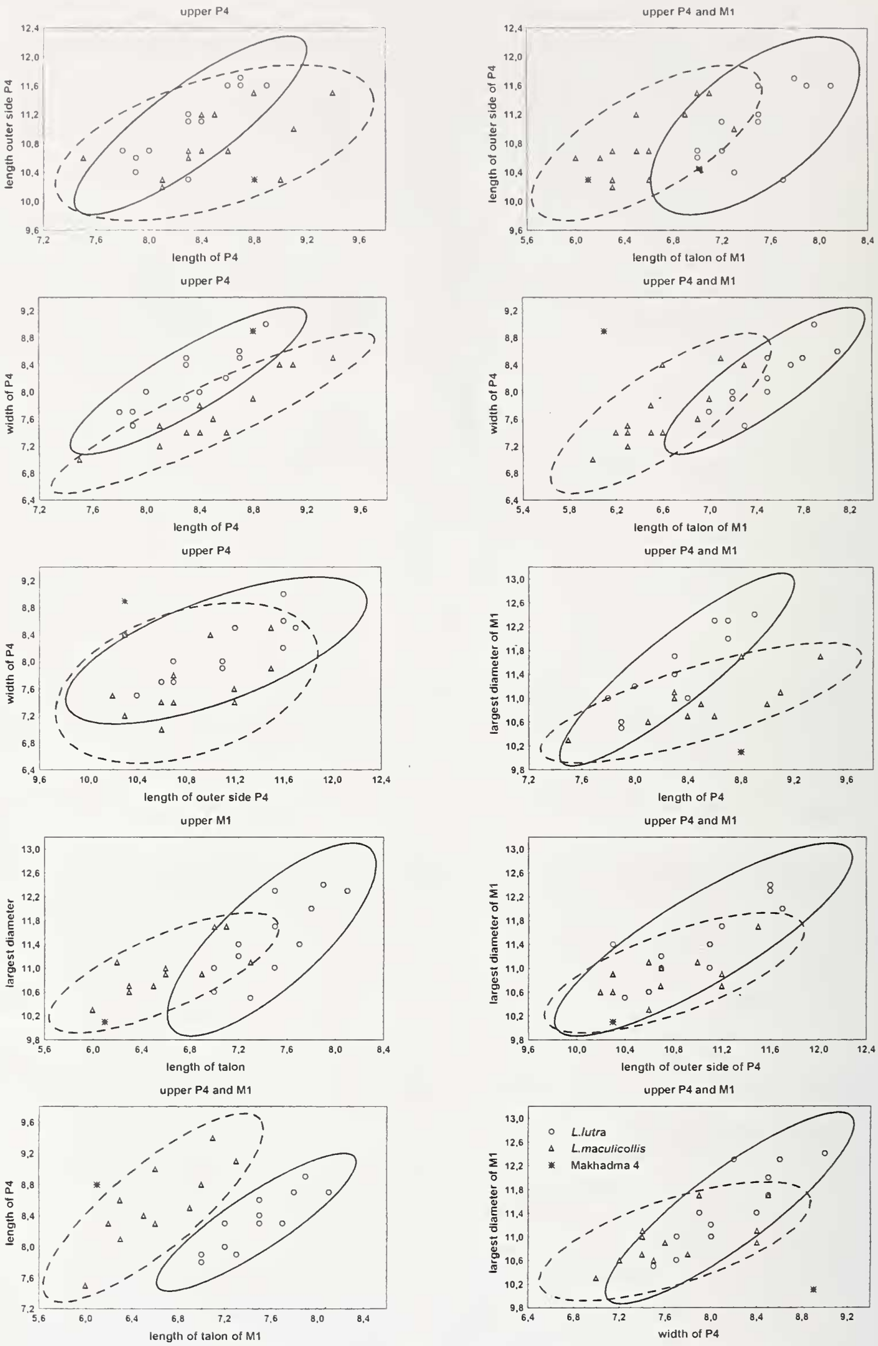

Fig. 3. Ellipses of equal probability (95 % confidence limits) for different pairs of measurements of the upper P4 and M1 of modern *Lutra maculicollis* (broken line) and *Lutra lutra* (solid line). The position of the Makhadma specimen is indicated by an asterisk (after Van Neer et al. 2000).

Because of the incomplete preservation of the M1, this last measurement could not be taken on the Makhadma specimen. In a following step, ellipses of equal probability (95 %) were constructed for the different pairs of measurements for the two species, and the position of the Makhadma specimens was verified (Fig. 3). In certain cases, the degree of overlap of the two species was considerable, but for other pairs the overlap was minimal or unexisting. The data points corresponding to the Makhadma specimen fall inside the variation of *L .maculicollis* and outside that of *L. lutra* in two instances. One pair of measurements (width versus length of P4) suggests an identification as *L. lutra*, whereas in another case, the measurements fall within the 95 % limits of both species. In three cases the data points fall outside the variation of both species, but in two instances the position of the Makhadma specimen to the ellipses is closest to spotted-necked otter. The osteometric data hence show that an identification as *Lutra maculicollis* is most likely. It is striking that the dental measurements show a less clear distinction between the two species than the postcranial material. It has already been shown before that tooth size is not a very accurate estimator of body size in several carnivores (Dayan 1991).

Discussion and conclusions

The osteological evidence for the presence of otter in Egypt is limited to the finds from Makhadma (12,000 cal BC) and Catfish Cave. The latter site yielded a mandible fragment (Reed 1966) that was found in layer 4, the top of which was radiocarbon dated to 7060 ± 120 BP (Y-7060) (Wendt 1966). The dated charcoal was deposited at a moment that layer 4 was already formed, meaning that the otter fragment must be older than 7000 years. The presence of otter is hence attested for the Late Palaeolithic, but it is striking that bone finds are lacking on Predynastic and later sites despite the large amount of extensive archaeofaunas. The absence of otter remains at the numerous Pharaonic and later archaeological sites was used by Houlihan (1996) as an argument for his hypothesis that the animal never occurred in Egypt. A review of the latest archaeozoological literature since the publication of Houlihan's paper did not reveal any new evidence for otter. Nevertheless, I believe that most of the iconographic data as well as the historical accounts of Herodotus and 17th century travellers indicate that the otter must still have lived along the Egyptian Nile a few centuries ago. Other aquatic species that have disappeared during the last few centuries are the hippopotamus (*Hippotamus amphibius*), crocodile (*Crocodylus niloticus*) and soft-shelled turtle (*Trionyx triunguis*), although the latter two species still occur in the poorly populated region along the High Dam Lake. The possible reasons for the poor archaeological visibility of otter and for its rather recent local extinction are discussed below.

The spotted-necked otter, like the common otter, lives along rivers and lakes with a high abundance of fish and with sufficient shelter on well vegetated shores (Lejeune 1989a). It is striking that the two sites where otter remains were found thus far represent specialised fishing settlements. As already mentioned above, the Makhadma sites are characterised by a heavy preponderance of fish remains, and this is also the case at Catfish Cave (Reed 1966; Wendt 1966). The focus on fishing activities by the inhabitants of Catfish Cave is also demonstrated by the numerous bone harpoons. Both Makhadma and Catfish Cave are typically located adjacent to a large wadi that allowed a prolonged fishing season. It is obvious that otters, as well as other ichthyophagic species, must have been present in such a favourable fishing environment. No such other species were found at Makhadma or Catfish Cave, but at the Late Palaeolithic fishing sites of Wadi Kubbaniya, where no otters were identified, the presence has been reported of herons and egrets (Ardeidae), pelicans (*Pelicanus*) and cormorant (*Phalacrocorax*) (Gautier & Van Neer 1989). These species are also attracted by the high concentration of fish (Bell-Cross 1974) and consequently may also become the prey of man.

The effect of the spotted-necked otter on the fish populations and fisheries has been analysed in detail for a population of Lake Muhazi, Rwanda (Lejeune 1989b, 1990). In this lake, the small *Haplochromis* species are not exploited by the fishermen that rather concentrate on the larger tilapia and *Clarias* catfish. Analysis of otter spraints, combined with direct observation of the feeding habits, has shown that the spotted-necked otter in Lake Muhazi actively captures *Haplochromis* and the smaller tilapia and that it also attacks the tilapia and catfish trapped in fishing nets (Lejeune 1990). It appeared that about a quarter of all tilapia and catfish caught in experimental fishing nets (with a mesh size of 4.5–5 centimetres) were attacked by the otters, and that about half of these fish became unsuitable for human consumption (Lejeune 1989b). In nets with a larger mesh size (6.5 cm) it was noted that all the catfish and 70% of the tilapia were attacked by otters. The damage done by otters to the total amount of fish captured by the Lake Muhazi fishermen, including those taken by other techniques than netting, was estimated to affect about one seventh of all landed fish.

It is unclear to what extent otters may have been interfering with the Late Palaeolithic fishing activities or if their presence was judged by the fishermen to be harmful to their fisheries. Most damage is done today to large catfish and tilapia larger than 20 cm trapped in the nets. A reconstruction of the body lengths of the fish caught at Late Palaeolithic Makhadma shows that tilapia larger than 20 cm were exploited, but that mainly smaller individuals were captured (Van Neer *et al.* 2000: 275 & 277). Except for the possible net weights found at one of the Makhadma sites, no evidence for nets is available. Only when nets were used, the damage would have been obvious and could have stimulated the active hunt for otters. In any case, since the majority of the exploited tilapia at Makhadma were smaller individuals, visible damage caused by otters would have been minimal. The fact that otter remains have thus far only been found on specialised fishing sites must not necessarily be related to competition for the same food resources. It may simply be a result of the fact that otters and men exploited the same territories and that the animals therefore also became an easier prey for man. Observations on the Rwandese spotted-necked otter have shown that the animals avoid areas where there is too much human disturbance, although they often show their curiosity for swimming children or passing dugouts (Lejeune 1989a). The animals never get caught in the traditional nets, but are regularly trapped in fishing baskets which is an important cause of mortality. In recent times, *Lutra maculicollis* has been intensively pursued for its fur, often during organised hunting parties with the aid of dogs. The species is also sensitive to habitat destruction causing loss of favourite sheltering places. In Rwanda, the increase in human population has resulted in partial replacement of well-vegetated shores by pasture land and cultivated fields (Lejeune 1989a: 193).

The absence of otters at Predynastic and later sites is possibly related to the fact that no specialised fishing sites are known from those periods. In addition, people became sedentary and domestic animals and plants were in use, which probably had a negative impact on the environment and on the otter populations. In more recent times, probably only a few centuries ago, the steady increase of human populations would have finally resulted in the local extinction of the species. Other archaeozoological evidence for habitat degradation along the Egyptian Nile is provided by Hutterer (1994). He described a thus far unknown species of shrew (*Crocidura balsamifera*) from New Kingdom animal tombs near Thebes. Apparently this shrew is totally extinct today, but a comparison with extant species indicates that it has affinities with shrews favouring swamps or gallery forests.

The exact relationship between the former otters and fishermen remains unclear. The animals may have been killed because they were considered a nuisance to the fisheries. The remains found probably represent food refuse, although it is not excluded that the animal's fur was also used. Kingdon (1977) reports that several African carnivores are traditionally eaten, but he does not mention this specifically for any of the otters. Both historic and archaeozoological evidence for the consumption of common otter meat in Italy is known for the 16th to 19th centuries AD (De Grossi Mazzorin & Minniti 1999). In 10% of the femurs, exostoses were found near their distal end, pathologies that may be related to the keeping in captivity. In 19th century Italy, common otters were trained to help and capture fish, in a way similar to the exploitation of cormorants. The compilation by Harris (1968) of the numerous records for such practices shows that otters were already used as an aid in fishing in China as early as the Tang Dynasty (AD 606-916). It would be too speculative to suggest such a relationship or taming for the Late Palaeolithic, a period during which no domestic animals were available yet. In the Pharaonic or later iconographic record no evidence is available that could point in the direction of otter taming.

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Zusammenfassung

Aus dem Fundmaterial der spät-paläolithischen Fischer-Stationen Makhadma 2 and 4 werden Skelettreste von Ottern beschrieben. Es handelt sich dabei um den zweiten archäozoologischen Fund von Ottern in Ägypten und um den ersten Fund, der eine Determination auf Artniveau erlaubt. Die möglichen Ursachen für die Seltenheit von Otterfunden in Fundstellen entlang des Nils in Ägypten werden ebenso diskutiert wie mögliche Ursachen für das rezente lokale Aussterben der Arten. Die Konsequenzen dieser Knochenfunde für die Interpretation von Tierdarstellungen und -statuetten im Alten Ägypten werden kurz erwähnt.

References

Bell-Cross, G. (1974): A fisheries survey of the upper Zambezi River system. – Occasional Papers of the National Museum of Rhodesia, B5: 279–338.

Boessneck, J. (1988): Die Tierwelt des alten Ägypten untersucht anhand kulturgeschichtlicher und zoologischer Quellen. – Verlag C. H. Beck, München.

Brunner-Traut, E. (1968): Ägyptische Mythen im Physiologus (zu Kapitel 26, 25 und 11). – Pp. 13–44, in Festschrift für Siegfried Schott zu seinem 70. Geburtstag am 20. August 1967 (W. Helck ed.). Otto Harrassowitz, Wiesbaden.

Dayan, T., D. Simberloff, E. Tchernov & Y. Yom-Tov (1991): Calibrating the paleothermometer: climate, communities, and the evolution of size. – Paleobiology 17: 189–199.

De Grossi Mazzorin, J. & C. Minniti (1999): Diet and religuous practices: the example of two monastic orders in Rome between the XVIth and XVIIIth centuries. – Anthropozoologica 30: 33–50.

Driesch, A. von den (1976): A guide to the measurement of animal bones from archaeological sites. – Peabody Museum Bulletin 1. Harvard University Press, Harvard.

Gautier, A. & W. Van Neer (1989): The animal remains from the Late Paleolithic sequence in Wadi Kubbaniya. – Pp. 119–161, in The Prehistory of Wadi Kubbaniya, Vol. 2, Stratigraphy, paleoeconomy and environment (F. Wendorf, R. Schild & A. E. Close eds.). Southern Methodist University Press, Dallas.

Haltenorth, T. & H. Diller (1980): A field guide to the mammals of Africa. – Collins, London.

Harris, C .J. (1968): Otters. – Weidenfeld and Nicolson, London.

Harrison, D. L. (1968): The mammals of Arabia. – Ernest Benn Ltd., London.

Houlihan, P. F. (1996): On Herodotus (II, 72), and the question of the existence of the otter (*Lutra* sp.) in Ancient Egypt. – Göttinger Miszellen 153: 45–55.

Hutterer, R. (1994): Shrews of Ancient Egypt: biogeographical interpretation of a new species. – Pp. 407–413, in Advances in the Biology of Shrews (J. F. Merritt, G. L. Kirkland, Jr. & R. K. Rose eds.). Carnegie Museum of Natural History, Special Publication 18.

Keimer, L. (1942): Quelques représentations rarissimes de mustélidés conservées sur des bas-reliefs de l'ancien empire. 1. La loutre (*Lutra* sp.). – Etudes d'Egyptologie 4: 1–10.

Kingdon, J. (1977): East African Mammals. Volume III Part A (Carnivores). – Academic Press, London.

Lejeune, A. (1989a): Ethologie des loutres (*Hydrictis maculicollis*) au lac Muhazi, Rwanda. – Mammalia 53: 191–202.

Lejeune, A. (1989b): Les loutres, *Lutra (Hydrictis) maculicollis* Lichtenstein, et la pêche artisanale. – Revue de Zoologie africaine 103: 215–223.

Lejeune, A. (1990): Ecologie alimentaire de la loutre (*Hydrictis maculicollis*) au lac Muhazi, Rwanda. – Mammalia 54: 33–45.

Osborn, D. J. & I. Helmy (1980): The contemporary land mammals of Egypt (including Sinai). – Field Museum of Natural History, Chicago.

Pohle, H. (1920): Die Unterfamilie der Lutrinae. – Archiv für Naturgeschichte A 85: 1– 246.

Reed, C. A. (1966): Organic remains from Yale University Nubian Expedition's archaeological sites D1-21B and W0-2A, with a discussion of the radiocarbon determinations. – Postilla 102: 35–45.

Rosevear, D. (1974): The carnivores of West Africa. – Trustees British Museum (Natural History), London.

Van Neer, W., E. Paulissen & P. M. Vermeersch (2000): Chronology, subsistence and environment of the Late Palaeolithic fishing sites of Makhadma-2 and 4. – Pp. 271–287 in Palaeolithic living sites in Upper and Middle Egypt (P.M. Vermeersch ed.). Leuven University Press, Leuven.

Vermeersch, P. M., E. Paulissen & W. Van Neer (1989): The Late Palaeolithic Makhadma sites (Egypt): environment and subsistence. – Pp. 97–114 in Late Prehistory of the Nile Basin and the Sahara (L. Krzyżaniak & M. Kobusiewicz eds.). Poznań Archaeological Museum, Poznań.

Vermeersch, P. M., Paulissen, E. & D. Huyge (2000): An Afian site at Makhadma 4. – Pp. 175–218 in Palaeolithic living sites in Upper and Middle Egypt (P. M. Vermeersch ed.). Leuven University Press, Leuven.

Wendt, W. E. (1966): Two prehistoric archaeological sites in Egyptian Nubia. – Postilla 102: 1–34.

Wreszinski, W. (1927): Bericht über die photographische Expedition von Kairo bis Wadi Halfa zwecks Abschluss der Materialsammlung für meinen Atlas zur altägyptischen Kulturgeschichte. – Max Niemeyer Verlag, Halle a.d.S.

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